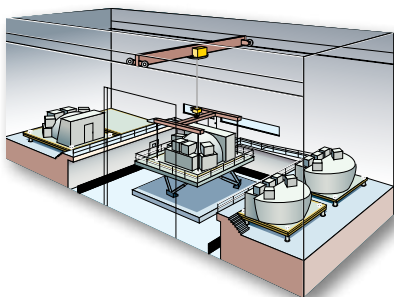


NASA's Strategic Capabilities Assets Program

NASA LANGLEY RESEARCH CENTER THE FLIGHT SIMULATION FACILITIES



The NASA Langley Research Center (LaRC) Flight Simulation Facilities, located in Hampton, VA, consist of the Cockpit Motion Facility, the Differential Maneuvering Simulator, the Development and Test Simulator, and the Test and Evaluation Simulator. The LaRC Flight Simulation Facilities have achieved internationally recognized Capability Maturity Model Integration Capability Level 3 ratings, which indicate enhanced overall systems and software engineering excellence.



The Cockpit Motion Facility is a multifaceted motion and fixed-base flight simulation research laboratory. It is designed to support aeronautics and space flight vehicle research studies in which motion cues are critical to the realism of the experiments being conducted. The Cockpit Motion Facility is made up of four fixed-base simulator sites and one motion-base simulator site. The simulators are the Research Flight Deck Simulator (all-glass reconfigurable cockpit with programmable sidestick control inceptors), the Integration Flight Deck Simulator (conventional transport cockpit with programmable wheel/column control inceptors), the Generic Flight Deck Simulator (all-glass reconfigurable futuristic cockpit with interchangeable programmable control inceptors), and a fourth simulator that is undefined at this time. Each of these simulators is designed to operate as a motion-base simulator or as a fixed-base simulator. The Cockpit Motion Facility is designed around a state-of-the-art, high-performance, 76-inch six-degree-of-freedom synergistic motion system. The simulators are moved from their fixed-base sites to the motion system through the use of an overhead bridge crane system.



The dual-dome Differential Maneuvering Simulator provides a means of simulating two fighter aircraft or spacecraft maneuvering with respect to each other. Each 40-foot-diameter dome contains a generic cockpit with glass instrumentation, programmable control inceptors, 360-degree field-of-view visual system, target image generator system, and high-resolution area-of-interest visual system. The simulator supports aeronautics and space research including unmanned aircraft systems research and planetary operations research. In addition, the simulator is used to conduct classified research.



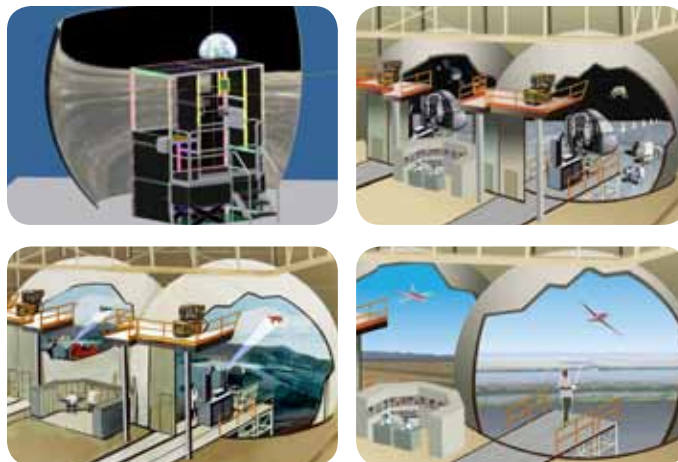
The Development and Test Simulator is a fixed-base, advanced all-glass transport with programmable sidestick control inceptors and panorama visual system. The simulator is currently configured with twin engine transport aircraft dynamics, which have been enhanced through data obtained in Langley wind tunnels. The simulator supports aeronautics research and is being evaluated for use in support of unmanned aircraft systems research.



The Test and Evaluation Simulator is reconfigurable to represent any type of vehicle. The simulator is currently configured to support the Orion Capsule or the Altair Lunar Lander development using actual Orion displays and controls. The simulator has a panorama visual system with adjustable cockpit floor to allow for standing or seated piloted operation and highly detailed International Space Station and Lunar South Pole/Shackleton Crater visual scenes. The simulator also supports aeronautics research and is being evaluated for use in support of unmanned aircraft systems research.

FACILITY BENEFITS

- World-class, unique, high-performance, state-of-the-art pilot-in-the-loop flight simulators with one-of-a-kind oculometer technology for all classes of aircraft and spacecraft.
- High quality, high reliability, low operating costs, and low-maintenance simulators
- Can be tied to simulation facilities at other NASA Centers, DOD facilities, FAA facilities, commercial facilities, and university facilities to conduct large-scale multivehicle simulations.
- Conduct research for advanced flight deck design and vehicle operations for Aviation Safety and Airspace Systems for the Next Generation Air Traffic Control System



FACILITY APPLICATIONS

- Aeronautical Research Simulators
 - Commercial transport
 - General aviation
 - Fighter
 - Futuristic designs
 - Unmanned Aircraft Systems/Vehicles
- Space Flight Research Simulators
 - Crew exploration and launch vehicle
 - Lunar and Planetary lander
 - Lifting bodies
 - Lunar and Mars environments
- Classified Research

MOTION SYSTEMS CHARACTERISTICS

Cockpit Motion Facility: Leg Stroke: 76 in / Payload: 22,000 lb			
Axis	Excursion	Velocity	Acceleration
Vertical	±41 in	±32 in/s	±1.0 g
Lateral	±55 in	±38 in/s	±0.7 g
Longitudinal	+67 in/-55 in	±38 in/s	±0.7 g
Pitch	+28 deg/-25 deg	±23 deg/s	±225 deg/s/s
Roll	±28 deg	±23 deg/s	±225 deg/s/s
Yaw	±38 deg	±30 deg/s	±225 deg/s/s

COCKPIT CHARACTERISTICS

	Research Flight Deck Simulator	Integration Flight Deck Simulator	Generic Flight Deck	Differential Maneuvering Simulator	Development and Test Simulator	Test and Evaluation Simulator
Motion base/fixed base	Yes/yes	Yes/yes	Yes/yes	No/yes	No/yes	No/yes
Mission profile	Full	Full	Full	Air combat/space operations/unmanned aircraft systems & vehicles	Full/unmanned aircraft systems & vehicles	Space operations/unmanned aircraft systems & vehicles
Crew station capacity	2 pilots/1 test engineer	2 pilots/1 test engineers	2 pilots/1 test engineer	2 pilots	2 pilots/1 test engineer	1 pilot/1 test engineer
Programmable control inceptor	Side sticks (SS)	Wheel/column (WC)	SS, WC, center sticks (CS)	SS, CS	SS	
Visual system FOV	200 x 40 panoramic	200 x 40 panoramic	WAC window (4)	Full 360 degrees	210 x 45 panoramic	135 x 67 panoramic
Cockpit instrumentation	Programmable displays, 4 x 17 in, HUD	B757 standard displays, HUD	Programmable displays, 4 x 21 in, 3 x 14 in, HUD	Programmable displays, D-size	Programmable displays, 8 x D-size	Programmable displays, 2 x 17 in

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